Place Interview Massing Element in database ~150

Input Project Parameters using Interview Dialog Box ~151

Optional

Manually Place additional Massing Elements ~152

Input Project Parameters using Additional dialog boxes ~154

Assemble Building Model (Run DMES Software) ~154

and/or

and/or

and/or

Pass DMES quanties to Estimating System ~156

Pass DMES Construction Sequence to scheduling Software ~158

Display Building Model ~160

Fig. 1a

Interview

Building Floor Area	22256	City	Tx, Dallas ▼
Number of Floors	1	SF per Person	200
Building Shape	Rectangle ▼		

| Info | Building | Site | Structure | Cladding | Lighting | HVAC | Tasks | T ◄ | ► |

Customer Name   Customer

Project Name   Project

Date   Date

Estimate #   01

CATEGORY   PERCENTAGE

General Conditions   8   _

Contingency   0

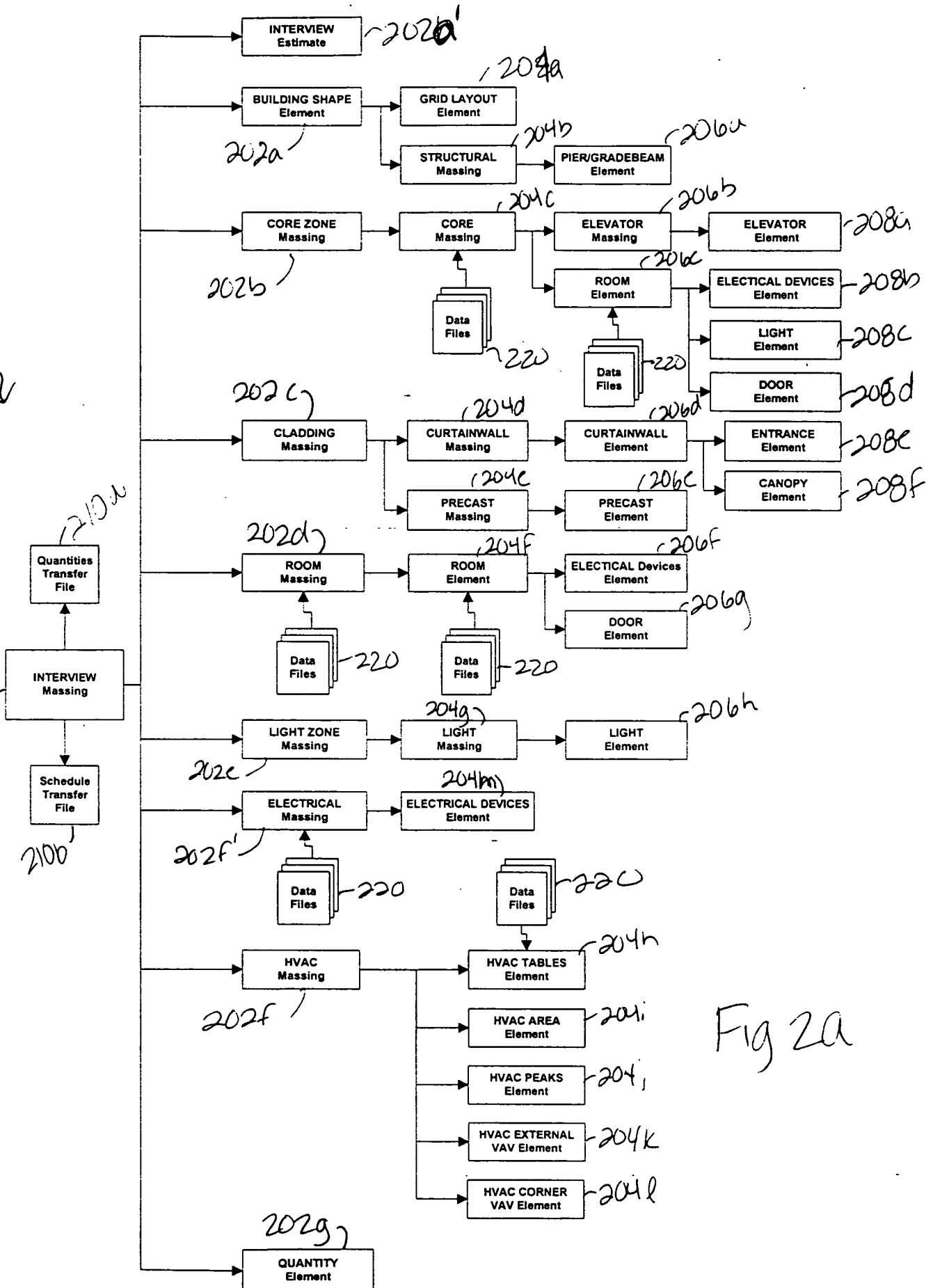Fee   5

[OK]   [Apply]   [Cancel]   [Help]

Fig. 1b

INTERVIEW Estimate ~202a'

BUILDING SHAPE Element 202a

GRID LAYOUT Element 204a

STRUCTURAL Massing 204b

PIER/GRADEBEAM Element 206a

CORE ZONE Massing 202b

CORE Massing 204c

Data Files 220

ELEVATOR Massing 206b

ELEVATOR Element 208a

ROOM Element 206c

Data Files 220

ELECTICAL DEVICES Element 208b

LIGHT Element 208c

DOOR Element 208d

CLADDING Massing 202c

CURTAINWALL Massing 204d

CURTAINWALL Element 206d

ENTRANCE Element 208e

CANOPY Element 208f

PRECAST Massing 204e

PRECAST Element 206e

ROOM Massing 202d

ROOM Element 204f

Data Files 220

Data Files 220

ELECTICAL Devices Element 206f

DOOR Element 206g

Quantities Transfer File 210a

INTERVIEW Massing 205

Schedule Transfer File 210b

LIGHT ZONE Massing 202e

LIGHT Massing 204g

LIGHT Element 206h

ELECTRICAL Massing 202f'

ELECTRICAL DEVICES Element 204m

Data Files 220

Data Files 220

HVAC Massing 202f

HVAC TABLES Element 204h

HVAC AREA Element 204i

HVAC PEAKS Element 204j

HVAC EXTERNAL VAV Element 204k

HVAC CORNER VAV Element 204l

QUANTITY Element 202g

200

Fig 2a

Values Passed between Interview and Core Zone

Interview to Core Zone

- Size of Building Floorplate
- Structural Slab Thickness
- Number of Floors
- Floor to Floor Heights
- Building Occupancy
- Assembly Tasks

```
                    ┌──────────────┐
                    │  CORE ZONE   │
                    │   Element    │
                    └──────────────┘

    ┌──────────────┐
    │  INTERVIEW   │
    │   Element    │
    └──────────────┘
```

Core Zone to Interview

- Locations of Stairs
- Sizes of Stairs
- Number of Elevators
- Sizes of Elevators
- Location of Core Rooms
- Sizes of Core Rooms
- Cost of Walls
- Cost of Doors and Hardware
- Cost of Electrical Fixtures
- Cost of Sanitary Fixtures
- Cost of Room Finishes

Fig 2b

Values Passed between Core Zone and Core Massing

Core Zone to Core Massing

- Size of Building Floorplate
- Number of Floors
- Structural Slab Thickness
- Building Occupancy
- Floor to Floor Heights
- Assembly Tasks

```
┌──────────────┐      ┌──────────────┐
│  CORE ZONE   │─────▶│     Core     │
│   Element    │◀─────│ Massing Element│
└──────────────┘      └──────────────┘
```

Core Massing to Core Zone

- Locations of Stairs
- Sizes of Stairs
- Number of Elevators
- Sizes of Elevators
- Location of Core Rooms
- Sizes of Core Rooms
- Cost of Walls
- Cost of Doors and Hardware
- Cost of Electrical Fixtures
- Cost of Sanitary Fixtures
- Cost of Room Finishes

Fig. 2c

Values Passed between Core Massing and Elevator Massing Element

Core Massing to Elevator Massing Element			Eleveator Massing Element to Core Massing
• Size of Building Floorplate • Number of Floors • Floor to Floor Heights • Structural Slab Thickness • Core Width • Building Occupancy	**Core Massing Element**	**Elevator Massing Element**	• Elevator Size and Position • Number of Elevators • Sizes of Elevators • Elevator PIT Depth • Net Square Foot Per Person • Total Elevator System Cost • Depth of Hydraulic Machine Room • Elevator Type

Fig. 2d

Values Passed between Elevator Massing and Elevator Element

Elevator Massing to Elevator Element			Elevator Element to Elevator Massing
• Elevator Type • No of Cars • Door Type • Elevator Platform Width • Elevator Platform Depth • Door Size • Elevator Car Width • Elevator Car Depth • Lobby Depth • No Cars Bay 1 • No Cars Bay 2 • Shaft Width Space • Shaft Rear Space • Shaft Front Space	**ELEVATOR Massing Element**	**ELEVATOR Element**	• Nothing

Fig. 2e

```
Data passed t  and retrieved
from the massing elements by
the Int rview Massing
```

Interi w Massing ~201

SET:
Building shape and size, number of floors and floor to floor heights, maximum girder and joist spans, core bay width and core bay location.

GET:
Perimeter points on floor shape, zone positions and rotations, number of bays on each side, total number of faces and total area, face angles, number of columns and column positions.

Building Shap Massing ~202a

SET:
Building shape and size, cladding and glazing types, number of floors, floor to floor heights, sill, head and parapet heights, slab thickness, column sizes and positions, entrance types and positions.

GET:
Column cover sizes, cladding offsets, column cover design configurations, percentage glazing.

Cladding Massing ~202b

SET:
Building shape and size, stair bay positions, number of floors, floor to floor height, minimum and maximum bay sizes and user type.

GET:
Overall core size and position, key core room and stair sizes and positions, hole sizes through slab, electrical loads on lighting circuits and power circuits.

Core Z n Massing ~202c

SET:
Building shape and size, number of floors, floor to floor heights, slab thickness.

GET:
Overall room positions and sizes, electrical loads on lighting circuits and power circuits.

Room Massing ~202d

SET:
Building shape and size, number of floors, floor to floor heights, slab thickness, overall core and stair positions and sizes, ceiling heights, column positions and sizes.

GET:
Number of light circuits and power requirements of each light circuit.

Light Zon Massing ~202e

SET:
Building shape, size and rotation, number of floors, floor to floor heights, slab thickness, ceiling heights, city, percentage glazing, building population.

GET:
HVAC grille sizes and positions, AHU and VAV box positions and electrical loads.

HVAC Massing ~202f

SET:
Positions and sizes of electrical rooms, electrical loads of lighting and power circuits, location of electrical service intake on site.

GET:
Electrical service equipment sizes and locations.

Electrical Massing ~202f'

SET:
Gross building area, number of floors and user type.

GET:
None required.

Quantity El ment ~202g

Fig. 2f

Interview Massing	Allows input of design requirements from customer and initiates automatic assembly of building model by placing instances of the next tier of massing elements in the hierarchy and passing them appropriate design parameters. This massing element also places an instance of the interview estimate element, which is automatically passed quantity data directly from each of the elements in the hierarchy.
Interview Estimate	Placed by the interview-massing element, this element is automatically passed quantity data by the other elements in the hierarchy when they are executed. It then generates a graphical spreadsheet in the database, which displays the cost estimate data.
Cladding Massing	Placed by the interview-massing element, this element is automatically passed the building parameters and the requirements for the cladding. It then assembles the appropriate cladding types on each part of each elevation of the building model by placing the curtainwall massing and precast massing elements as required.
Curtainwall Massing	Calculates the curtainwall cladding and glazing requirements for the building from the building parameters passed to it by the interview-massing element and design data read in from external data files. This element then assembles the curtainwall cladding and windows around the building by placing consecutive instances of the curtainwall element and the parapet, entrance and canopy elements.
Curtainwall Element	Designs the individual curtainwall or glazing panel from design parameters passed to it by the curtainwall-massing element. This element also calculates an accurate set of quantities for materials and components used to assemble the panel. The element can also place instances of the entrance and canopy elements when required, and pass them appropriate design parameters.
Parapet Element	Designs the individual roof parapet sections from design parameters passed to it by the curtainwall-massing element. This element also calculates an accurate set of quantities for materials and components used to assemble the parapet section.
Entrance Element	Designs the individual entrance doors and panels from design parameters passed to it by the curtainwall element. This element also calculates an accurate set of quantities for materials and components used to assemble the entrance.
Canopy Element	Designs the individual canopies over the main entrances from design parameters passed to it by the curtainwall element. This element also calculates an accurate set of quantities for materials and components used to assemble the canopy.
Curtainwall Estimate	Placed by the curtainwall-massing element, this element is automatically passed quantity data by the curtainwall elements when they are executed. It then generates a graphical spreadsheet in the database, which displays the cost estimate data for the curtainwall cladding and glazing.
Precast Massing	Calculates the precast cladding requirements for the building from the building parameters passed to it by the interview-massing element and design data read in from external data files. This element then assembles the precast panels around the building by placing consecutive instances of the precast element.
Precast Element	Designs the individual precast panel from design parameters passed to it by the precast-massing element. This element also calculates an accurate set of quantities for materials, components and labor used to assemble the panel.
Precast Estimate	Placed by the precast-massing element, this element is automatically passed quantity data by the precast elements when they are executed. It then generates a graphical spreadsheet in the database, which displays the cost estimate data for the precast cladding.
Core Zones Massing	Placed by the interview-massing element, this element is automatically passed the building parameters and the requirements for the various core layouts. It then assembles the appropriate core layouts into each zone on each floor of the building model by placing the core massing element as required.
Core Massing	Calculates the core requirements for the building from the building parameters passed to it by the interview-massing element and design data read in from external data files. This element then assembles the rooms in the core of the building by placing the elevator massing element and consecutive instances of the room element.
Room Massing	Calculates the room requirements for the building from the building parameters passed to it by the interview-massing element and design data read in from external data files. This element then assembles the rooms on each floor of the building by placing consecutive instances of the room element.
Room Element	Calculates the requirements for each room from the room parameters passed to it by the core-massing or room-massing elements and design data read in from external room data files. This element then assembles the contents of the room in by placing instances of the lighting, electrical devices and furniture elements.
Stair Element	This element calculates the floor to floor stair requirements from data sent to it by the room element and sizes itself to fit the building.
Grouping Massing	This element assembles a group of instances in the appropriate locations from data read in from external data files. This element is typically placed by the room element to control the grouping of the contents of the room.
Door Element	This element calculates the opening requirements from data sent to it by the room element and sizes itself to fit the door opening.
Room Estimate	Placed by the core-massing or room-massing elements, this element is automatically passed quantity data by the room elements when they are executed. It then generates a graphical spreadsheet in the database, which displays the cost estimate data for the rooms.
Elevator Massing	Calculates the elevatoring requirements for the building from the building parameters passed to it by the interview-massing element and design data read in from external data files. This element then assembles the elevators on each floor of the building by placing consecutive instances of the elevator typical element and the elevator roof element.

Fig 29

Elevator Typical Element	This element calculates the typical floor to floor elevator requirements from data sent to it by the elevator massing element and sizes itself accordingly.
Elevator Roof Element	This element calculates the roof level elevator requirements from data sent to it by the elevator massing element and sizes itself accordingly.
Elevator Estimate	Placed by the elevator-massing element, this element is automatically passed quantity data by the elevator elements when they are executed. It then generates a graphical spreadsheet in the database, which displays the cost estimate data for the elevators.
Light Massing	Calculates the lighting requirements for each floor of the building from the building parameters passed to it by the interview-massing element and design data read in from external data files. This element then assembles the lights on each floor of the building by placing consecutive instances of the light element. Potential clashes between lights and other building components are automatically handled by functionality in this element checking the positioning of these elements and repositioning each light.
Light Element	Configures its self as the appropriate light fixture dependent on data passed to it by the light massing element. This element also routes its own circuit wiring to connect it to its neighbor in the circuit or to the light switch or appropriate junction box. It then calculates the types and quantities of wire and insulation used.
Lighting Estimate	Placed by the light-massing element, this element is automatically passed quantity data by the light elements when they are executed. It then generates a graphical spreadsheet in the database, which displays the cost estimate data for the lights and wiring.
Building Shape Element	Determines the building configuration and floor plate area. Allows adjustment of various variables that make up the building perimeter. Calculates the perimeter points and sends this information to the grid/dimension element to calculate the grid layout then the structure element is called to calculate the structural components and estimate.
Grid/Dimension Element	Calculates the grid layout dimensions for the building configuration.
Structure Element	Receives the building layout and grid locations from above elements then calculates all pier, column, beam and joist locations. Accumulates all quantities and develops an estimate for the structure.
Pier Cap/Grade Beam Element	Calculate the location and sizes for the pier caps and grade beams.
Electrical Massing	Calculates the electrical service requirements for each floor of the building from the parameters passed to it by the interview-massing element and design data read in from external data files. This element then assembles electrical service equipment and wiring on each floor of the building by placing consecutive instances of the electrical device element. It can also generate a graphical spreadsheet in the database, which displays the high and low voltage electrical service panel circuit breaker diagrams.
Electrical Device Element	Configures its self as the appropriate electrical equipment or device dependent on data passed to it by the electrical massing element. This element also routes its own circuit wiring to connect it to its neighbor in the circuit or to the appropriate junction box. It then calculates the types and quantities of wire and insulation used.
Electrical Estimate	Placed by the electrical-massing element, this element is automatically passed quantity data by the electrical device elements when they are executed. It then generates a graphical spreadsheet in the database, which displays the cost estimate data for the electrical devices, equipment and wiring.
HVAC Massing	Receives the building configuration from the building shape element then calls the HVAC Area element to calculate all zone areas. Then passes these areas to the peaks element which calls the tables element and the floor and building peak loads are calculated. This element then places instances of the exterior, interior and corner VAV elements, which calculate the VAV box and Duct sizes.
HVAC Exterior VAV Element	Calculates the exterior VAV box, duct and diffuser sizes for the perimeter zones.
HVAC Interior VAV Element	Calculates the interior VAV box, duct and diffuser sizes.
HVAC Corner VAV Element	Calculates the corner VAV box, duct and diffuser sizes for the perimeter zones.
HVAC Area Element	Receives the building perimeters from the HVAC massing element, breaks the building up into interior, exterior and corner zones then calculates the floor square footage for each zone.
HVAC Peaks Element	Receives the ASHRAE cooling and heating load tables from the tables element and the zone areas from the area element and calculates the building and floor peak load design criteria.
HVAC Tables Element	Receives the longitude, latitude and other pertinent information about the building location and creates cooling load, solar gain and factor tables to be used to calculate the design building loads.
HVAC Estimate	Placed by the HVAC-massing element, this element is automatically passed quantity data by the HVAC elements when they are executed. It then generates a graphical spreadsheet in the database, which displays the cost estimate data for the HVAC system.

Fig. 2h

Site Massing	Calculates the site requirements for the building from the building parameters passed to it by the interview-massing element and design data read in from external data files. This element then assembles the site layout around the building by placing applicable instances of the site element.
Site Element	Designs the individual site elements from design parameters passed to it by the site-massing element. This element also calculates an accurate set of quantities for materials and components used to assemble the site layout.
Site Estimate	Placed by the site-massing element, this element is automatically passed quantity data by the site elements when they are executed. It then generates a graphical spreadsheet in the database, which displays the cost estimate data for the site layout.
Quantities Element	Placed by the interview-massing element, this element calculates additional required building components not covered by the individual estimate elements listed above. Applicable building information is passed by the interview-massing element when it is executed. It then generates a graphical spreadsheet in the database, which displays the cost estimate data for the additional building components. It also passes its quantity data directly to the interview estimate element.

Fig 21

Fig. 3

PROGRAMMING:
Interview & Define
Project Parameters
_300_

DMES
Initiate Unlimited Design, Estimating
& Scheduling Scenarios
(Constrained by Project Parameters)
_302_

Initiate Code Interpretation
Refinement Scenarios
(Constrained by Project Parameter)
_308_

Market Circumstances
Change Original
Project Parameters

Submit Construction
Documents for Permits
_306_

Design, Buget &
Schedule Review,
Owner Approval
_304_

Non-Final

Final

Final Owner Approval
_310_

NO

YES

Construction Documentation;
Including Construction Drawings,
Details, Specifications, Renderings,
Movie Paths & Shop Drawings,
Itemized Budget and Detailed
Construction Schedules
Simultaneously Produced

Project Construction
_312_

Inspection

Project Commissioning
_314_

Building Shape and Grid Layout

☐ Change Sturture Coordinates / Bays

Modify Zone # |0 |

| Info | Modify | Points | Perimeter |

Floor Plate Area |25000 |
Number Of Floors |2 |
Building Rotation |0 |
Girder Direction(N/S or E/W) |N/S |
Girder Max Span |40'0" |
Joist Max Span |35'0" |
Cladding Max Span |40'0" |
---Variables Along X-Axis---
Core Bay Location | |
Core Bay Width |20'0" |
Offset Columns |1'0" |
---Variables Along Y-Axis---
Core Bay Location |2 |
Core Bay Width |20'0" |
Offset Columns |1'0" |

                                         |Rectangle   ▼|

☐ Show Grids Only   ☐ Show Girders _Columns

☑ Show Dimensions   ☐ Columns Only

☐ Return to Default Values

☑ Get Cladding Bay Lengths

☐ Show Estimate

☑ Assemble   ～402

Save as Building Number |-1 |
Reconstruct Building Number |-1 |

| OK | Apply | Cancel | Help |

Building Shap   and Grid Layout

☐ Change Sturture Coordinates / Bays

Modify Zone # |0 |

| Info | Modify | Points | Perimeter |

Number of Zones |3 |
Zone Rotation |0 |
☑ Perimeter Columns

X-AXIS DIMENSIONS
Column Width |2'0'' |
Number of Bays |7 |
Freeze Bay (Number,Length) | | ☐ Unfreeze

Y-AXIS DIMENSIONS
Column Width |2'0'' |
Number of Bays |4 |
Freeze Bay (Number,Length) | | ☐ Unfreeze

☐ Dimension Lines Top

☑ Dimension Lines Right

☑ Calc Min. Number Bays

☐ Undo Last Change

~404

| OK | | Apply | | Cancel | | Help |

Building Shape and Grid Layout

☐ Change Sturture Coordinates / Bays

Modify Zone #   [0   ]

| Info | Modify | Points | Perimeter |

Point 1 (X,Y)   [0,0   ]
Point 2 (X,Y)   [210,0   ]
Point 3 (X,Y)   [210,80   ]
Point 4 (X,Y)   [180,105   ]
Point 5 (X,Y)   [180,120 -   ]
Point 6 (X,Y)   [-30,120   ]
Point 7 (X,Y)   [-30,40   ]
Point 8 (X,Y)   [0,15   ]
Point 9 (X,Y)   [0,0   ]
Point 10 (X,Y)   [   ]
Point 11 (X,Y)   [   ]
Point 12 (X,Y)   [   ]
Point 13 (X,Y)   [   ]
Point 14 (X,Y)   [   ]
Point 15 (X,Y)   [   ]
Point 16 (X,Y)   [   ]
Point 17 (X,Y)   [   ]
Point 18 (X,Y)   [   ]
Point 19 (X,Y)   [   ]
Point 20 (X,Y)   [   ]

Start Point X , Y   [30,0   ]

~406

| OK | Apply | Cancel | Help |

Building Shap　and Grid Lay　ut

☐ Change Sturture Coordinates / Bays

Modify Zone #　　　　　　　　　　　　　　0

| Info | Modify | Points | Perimeter |

Point 1 (X,Y)　　　0,0
Point 2 (X,Y)　　　0,1
Point 3 (X,Y)　　　0,2
Point 4 (X,Y)　　　0,3
Point 5 (X,Y)　　　0,4
Point 6 (X,Y)　　　1,1
Point 7 (X,Y)　　　1,2
Point 8 (X,Y)　　　2,1
Point 9 (X,Y)　　　2,2
Point 10 (X,Y)　　2,3
Point 11 (X,Y)　　2,4
Point 12 (X,Y)　　2,5
Point 13 (X,Y)　　2,6
Point 14 (X,Y)　　2,7
Point 15 (X,Y)　　0,6
Point 16 (X,Y)　　0,7
Point 17 (X,Y)　　0,8
Point 18 (X,Y)
Point 19 (X,Y)
Point 20 (X,Y)
Point 21 (X,Y)
Point 22 (X,Y)
Point 23 (X,Y)
Point 24 (X,Y)
Point 25 (X,Y)
Point 26 (X,Y)

| OK | Apply | Cancel | Help |
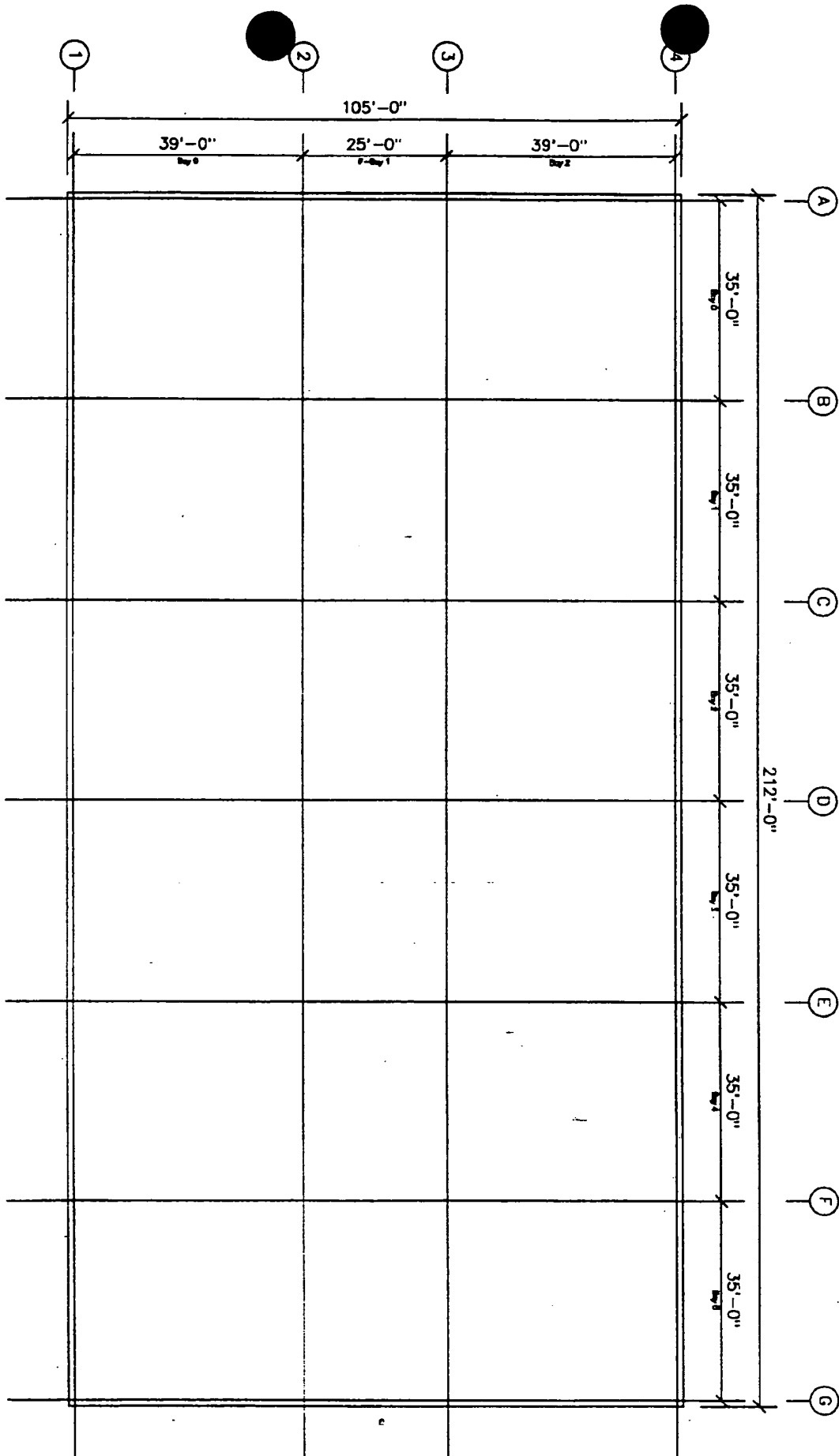
~408

Fig. 4e

105'-0"

39'-0"
Bay 0

25'-0"
F-Bay 1

39'-0"
Bay 2

212'-0"

35'-0"
Bay 0

35'-0"
Bay 1

35'-0"
Bay 2

35'-0"
Bay 3

35'-0"
Bay 4

35'-0"
Bay 5

Stru ture

☐ Change Sturture Coordinates / Bays

| Info | Modify | Structure | Openings |

Area per floor	22000
Number of Floors	2
Height of Floor 1	18'0"
Typical Floor Height	13'-6"
Joist Width	8"
Max Pan Width	5'-6"
Slab Thickness	4-3/4"
Pan Depth	1'-8"
Rotation	0
Skin Module	5'0"
Live Load	50
Partition Load	20
Skin Load	700

Building Shape

| Rectangle ▼ |

☐ N/S Dimension   ☐ E/W Dimension

☐ Get PrecastInformation   ☐ Show Estimate

☑ Show Joist Location   ☐ Show 3d Joist

☐ Show Dimensions   ☑ Show Grids Only

420

| OK | Apply | Cancel | Help |

Structur

☐ Change Sturture Coordinates / Bays

| Info | Modify | Structure | Openings |

Zone Number	0 .
Girder Max Span	42'0"
Joist Max Span	35'0"
Minimum Bay Width	20'0"
Interior Beam Width	1'0"
Offset Columns	1'0"

---X_Axis Changes ---

Number of Bays   6   ☐ Accept

Core Bay Number X-Axis

Core Bay Width X-Axis   20'0"

Adjust Bay Number	Length
1	30'0"
4	20'0"
6	10'0"

----Y_Axis Changes ----

Number of Bays   3   ☐ Accept

Core Bay Number Y-Axis

Core Bay Width Y-Axis   20'0"

Adjust Bay Number	Length
2	22'0"
	0"
	0"

☑ Accept Above Changes

| OK | Apply | Cancel | Help |

~422

Structure

☐ Change Sturture Coordinates / Bays

| Info | Modify | Structure | Openings |

	X coord.	Y coord.
Point 1	0"	0"
Point 2	210'0"	0"
Point 3	210'0"	80'0"
Point 4	180'0"	105'0"
Point 5	180'0"	120'0"
Point 6	-30'0"	120'0"
Point 7	-30'0"	40'0"
Point 8	0"	15'0"
Point 9	0"	0"
Point 10	0"	0"
Point 11	0"	0"
Point 12	0"	0"
Point 13	0"	0"
Point 14	0"	0"
Point 15	0"	0"

Move Point #1

X =

Y =

0"

0"

~424

| OK | Apply | Cancel | Help |

Structure

☐ Change Sturture Coordinates / Bays

| Info | Modify | Structure | Openings |

Zone Number   0

Opening Number   1
Lower Left X value   5'0"
Lower Left Y value   30'0"
Opening Width   20'0"
Opening Height   10'0"

Opening Number   2
Lower Left X value   35'0"
Lower Left Y value   60'0"
Opening Width   20'0"
Opening Height   10'0"

☐ Accept

☐ Zero all Openings

~426

| OK | Apply | Cancel | Help |

105'-0"

39'-0" Bay 0 | 25'-0" F-Bay 1 | 39'-0" Bay 2

1 | 3 | 4

A
35'-0" Bay 0
B
35'-0" Bay 1
C
35'-0" Bay 2
D
35'-0" Bay 3
E
35'-0" Bay 4
F
35'-0" Bay 5
G

212'-0"
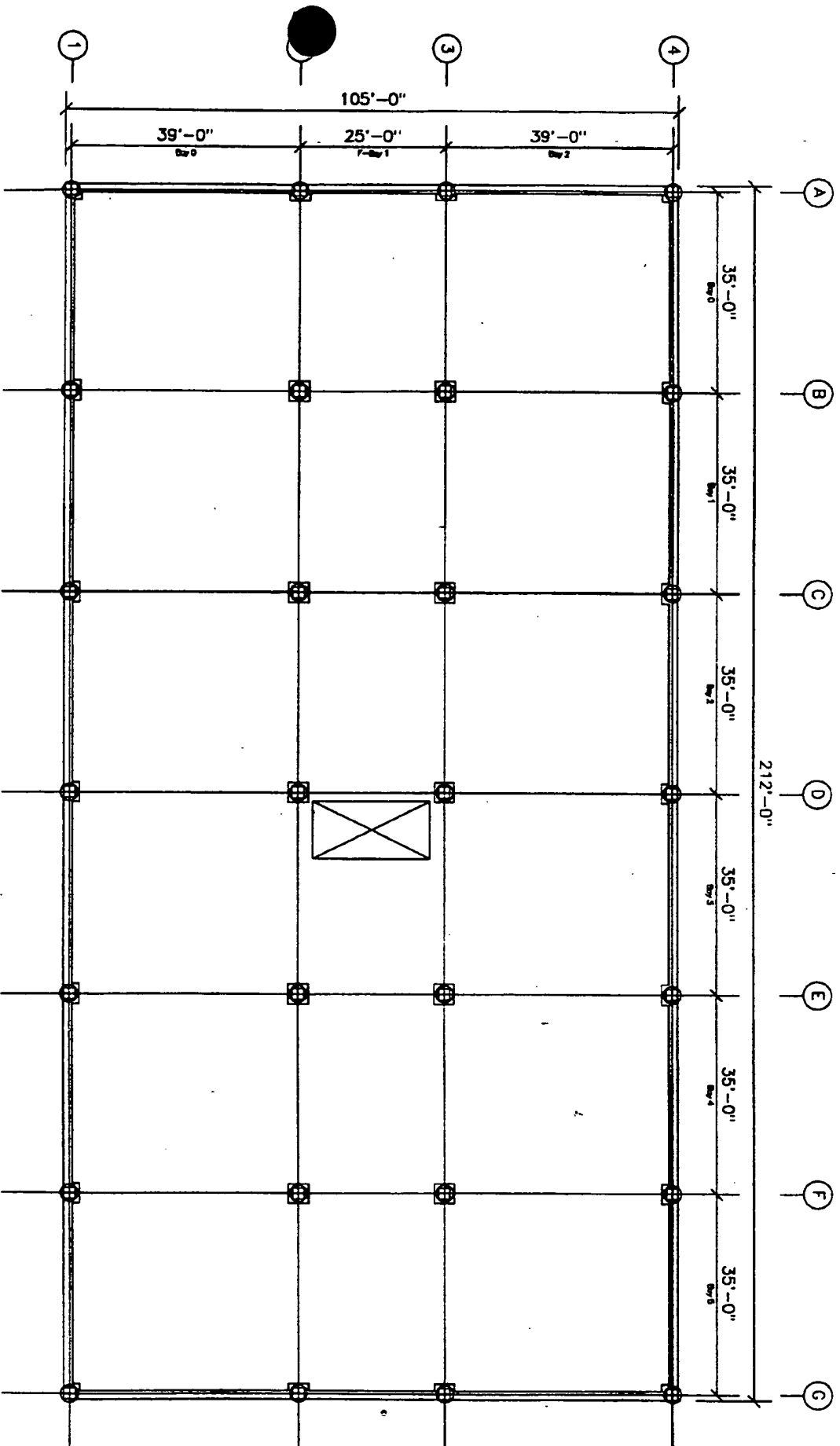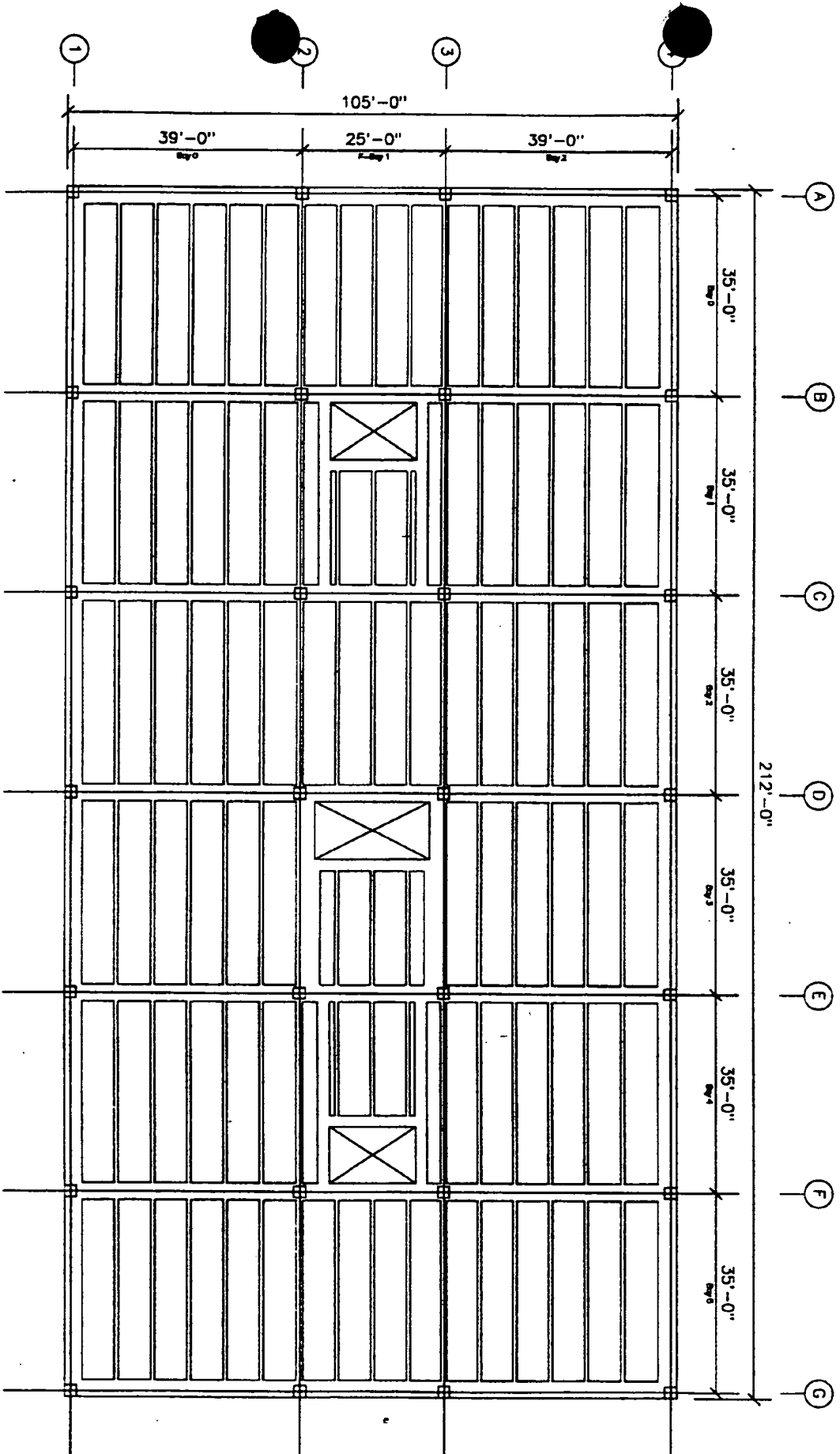
Figure 4j

Figure 4k

Specific Design Process
Figure 4I
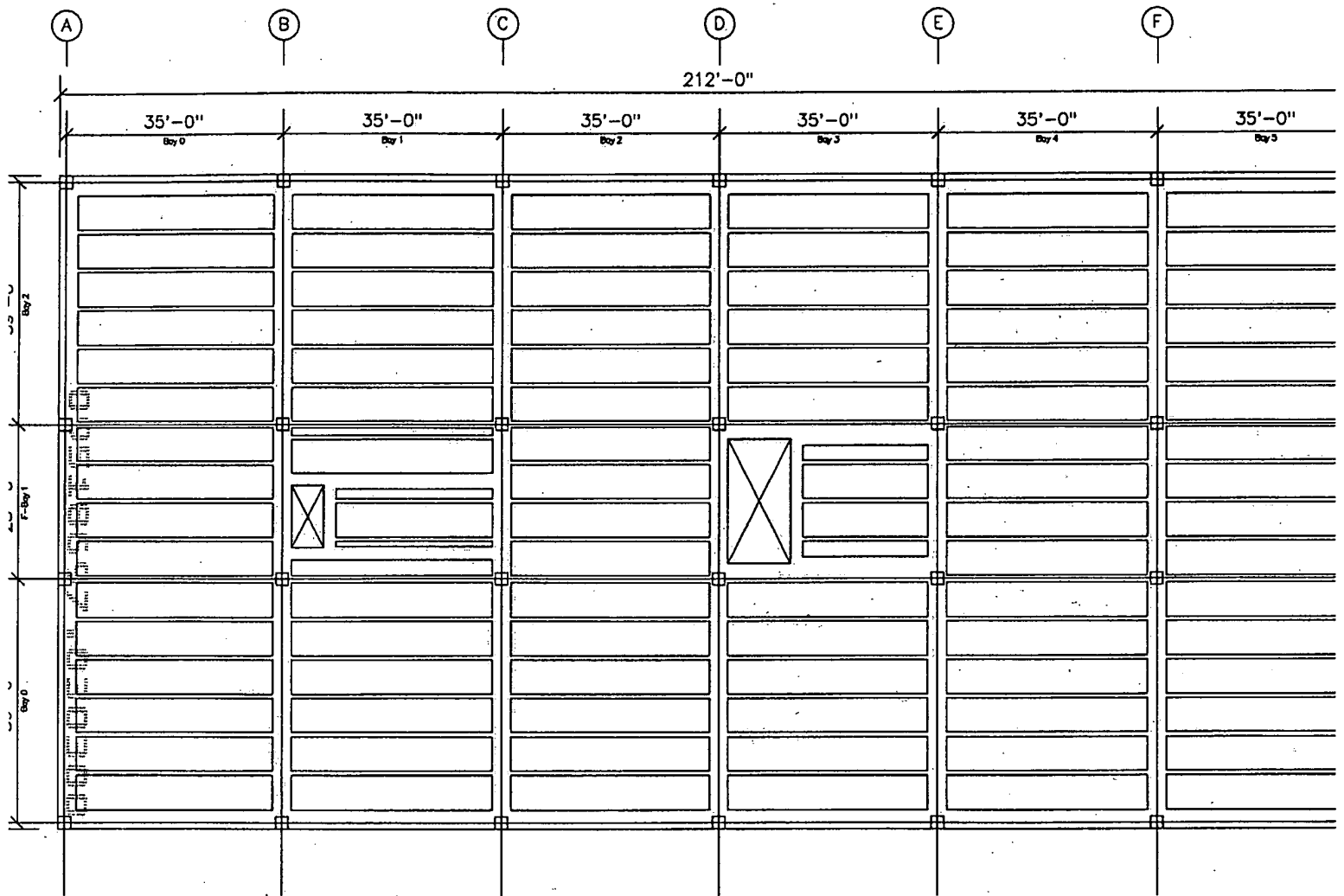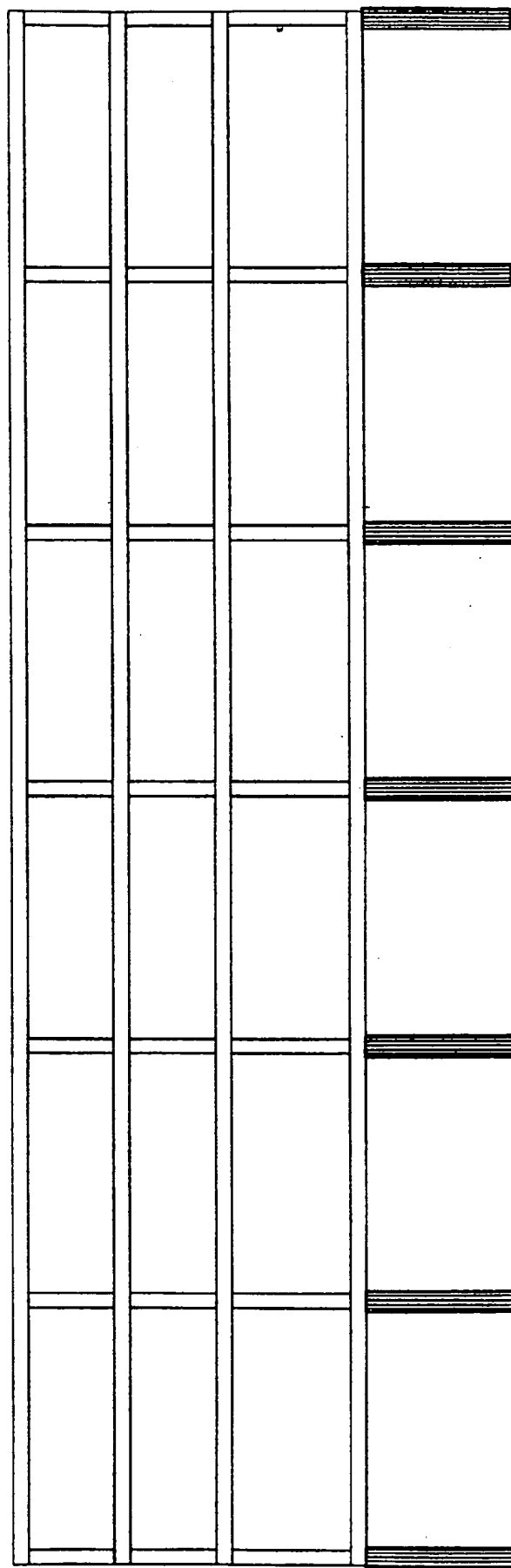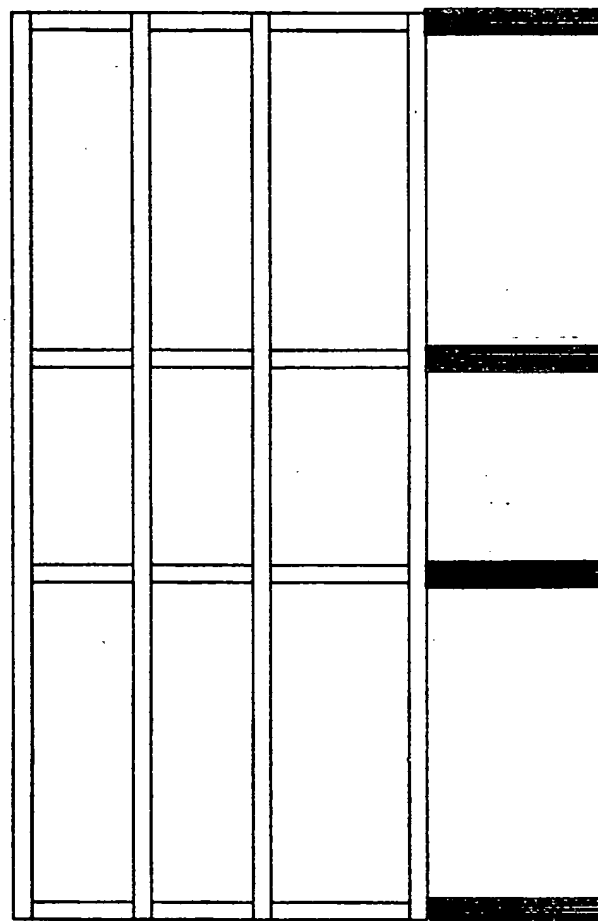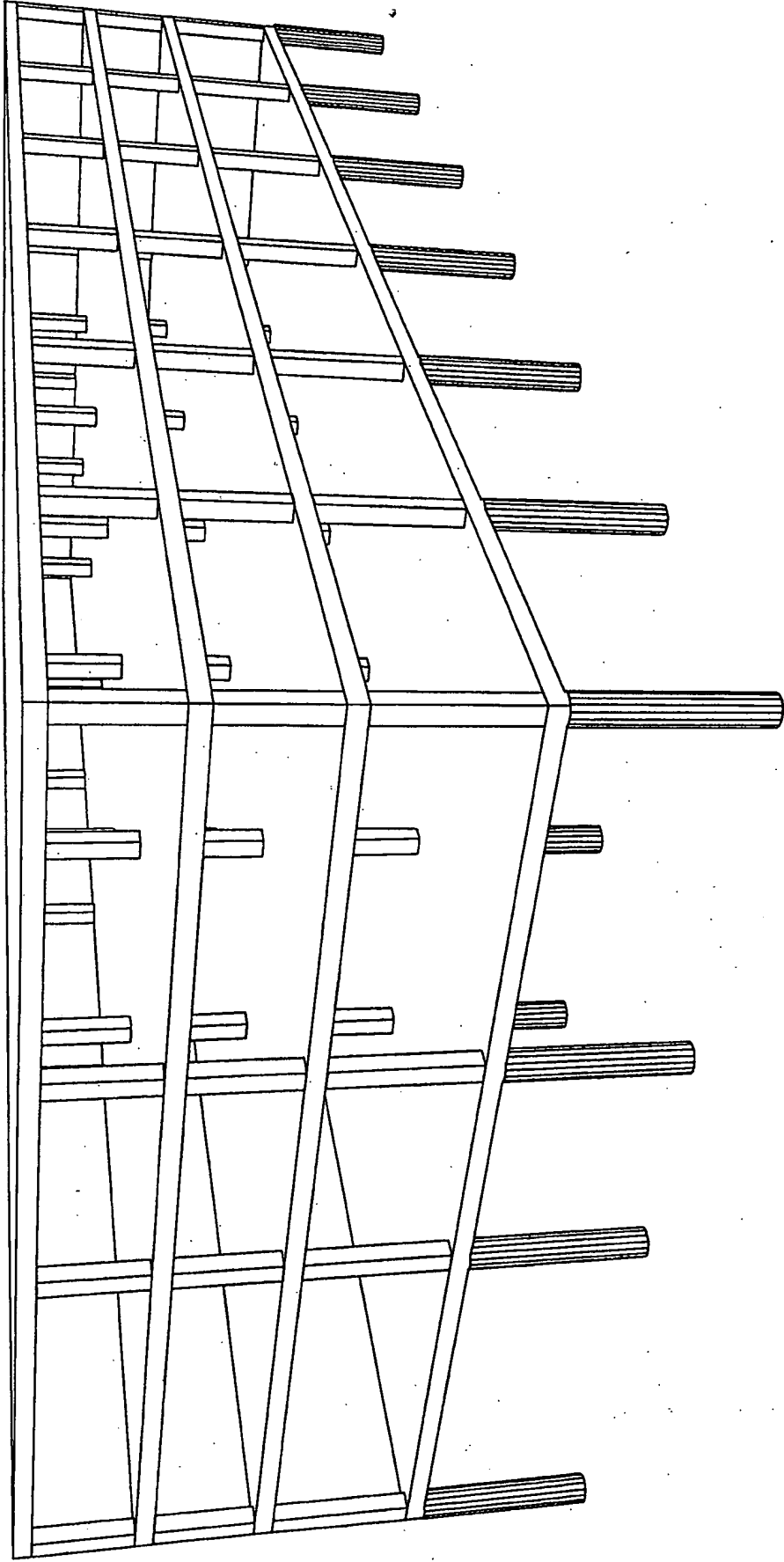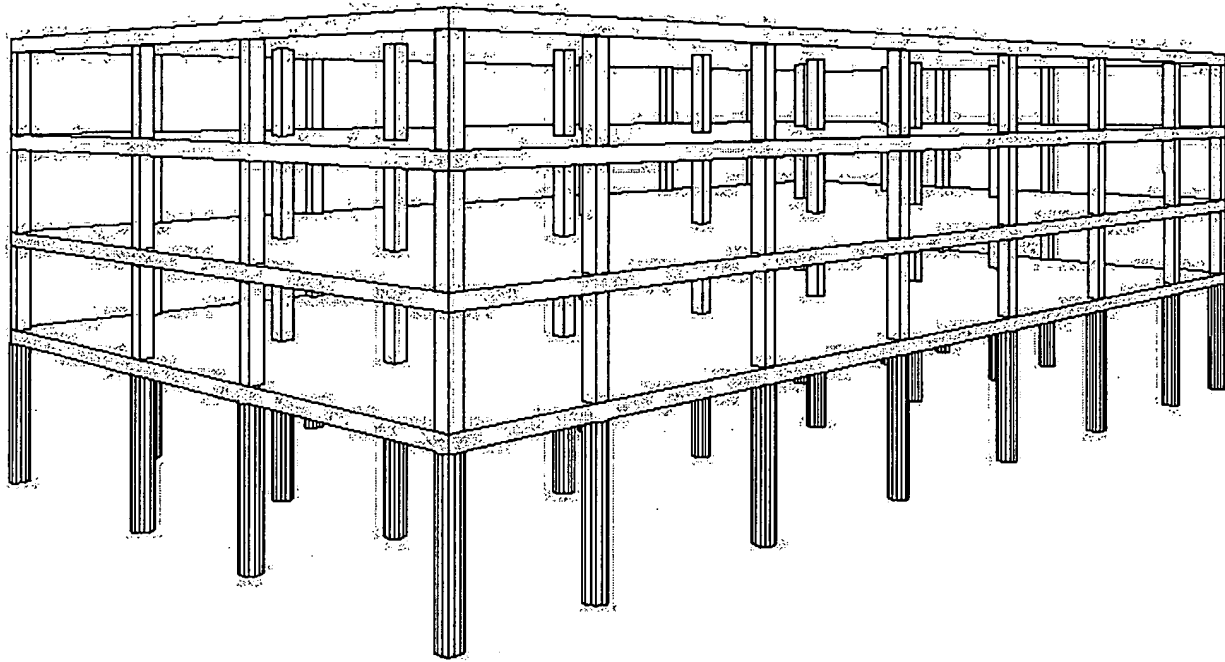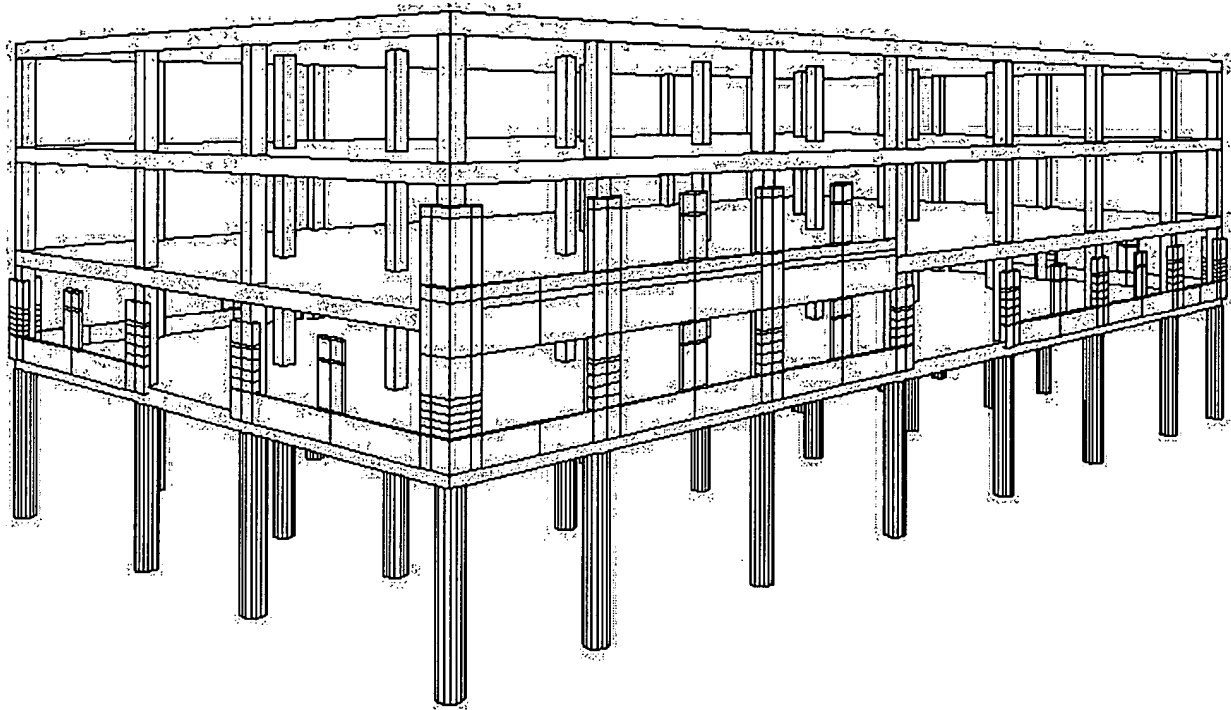
212'-0"

A	B	C	D	E	F

| 35'-0" | 35'-0" | 35'-0" | 35'-0" | 35'-0" | 35'-0" |
| Bay 0 | Bay 1 | Bay 2 | Bay 3 | Bay 4 | Bay 5 |

Figure 4m

Fig. 4n

Figure 4o

Fig. 5a

Fig.5b

Fig.5C

Fig.5d

Fig. 5e

Fig.5 P

Fig. 5g

Fig.5h

Fig. 5i

Fig.5j

Fig. 5K

Fig. 51

Input initial
Values for
Parameters — 500

Select Parameter
to "Rattle" — 502?

Select
Increment
Value — 504

Select Stop
Value for
Selected Parameter — 506

Assemble
building model
Using initial
Parameter values — 508

Save
Building
Model — 510

Increment
Selected Param.
by Sel. Inc. Val — 512

Reassemble
Building Model — 514

Save new
Building
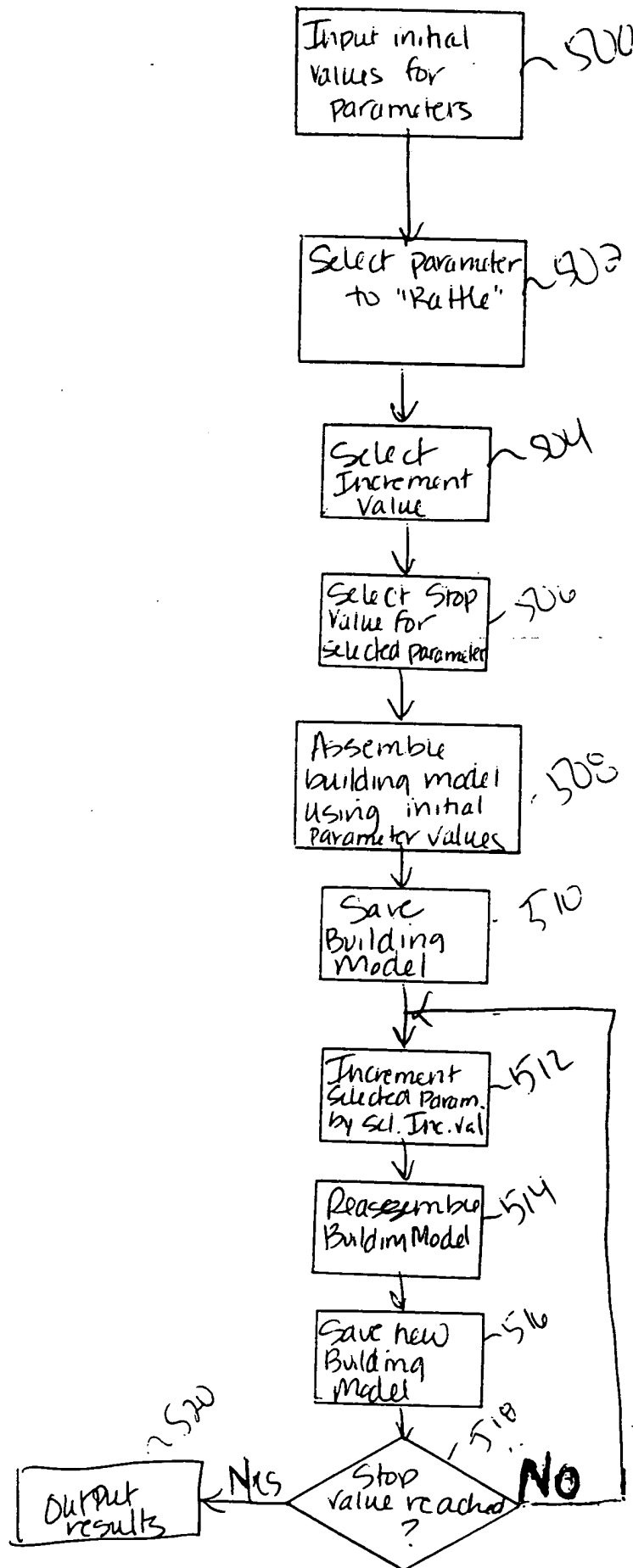Model — 516

Stop
value reached
? — 518

Output
results — 520

YES

NO
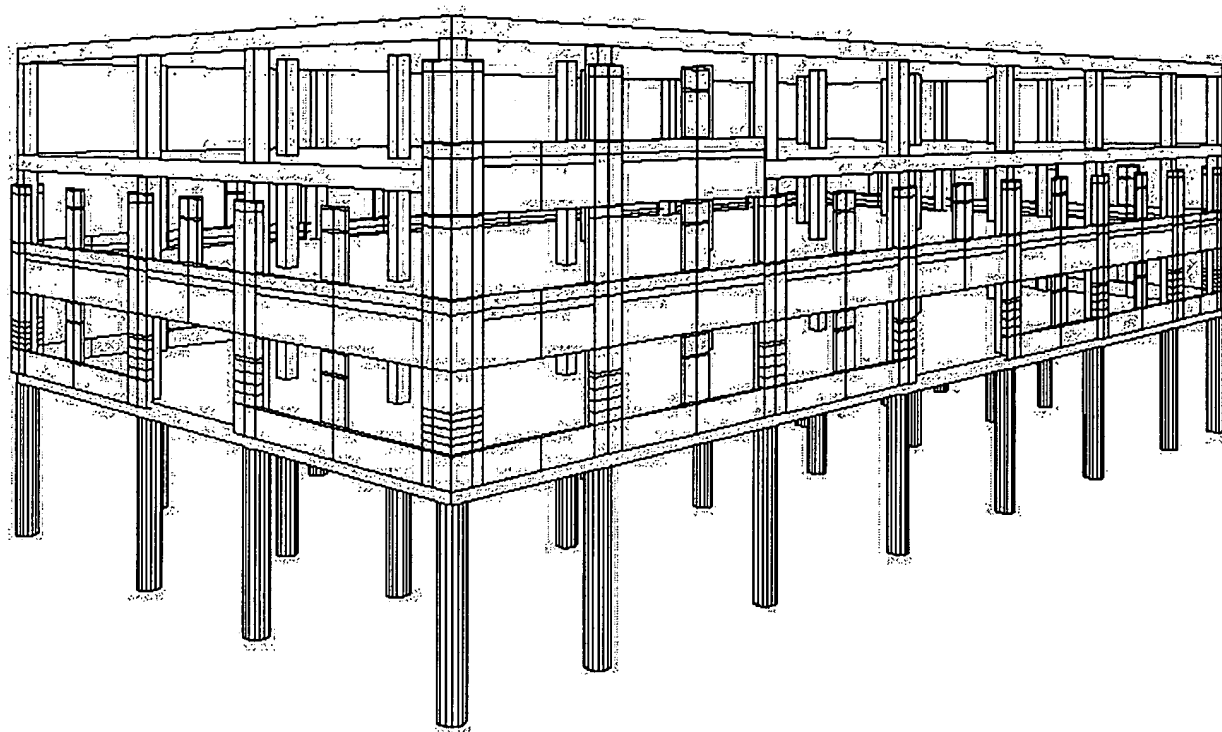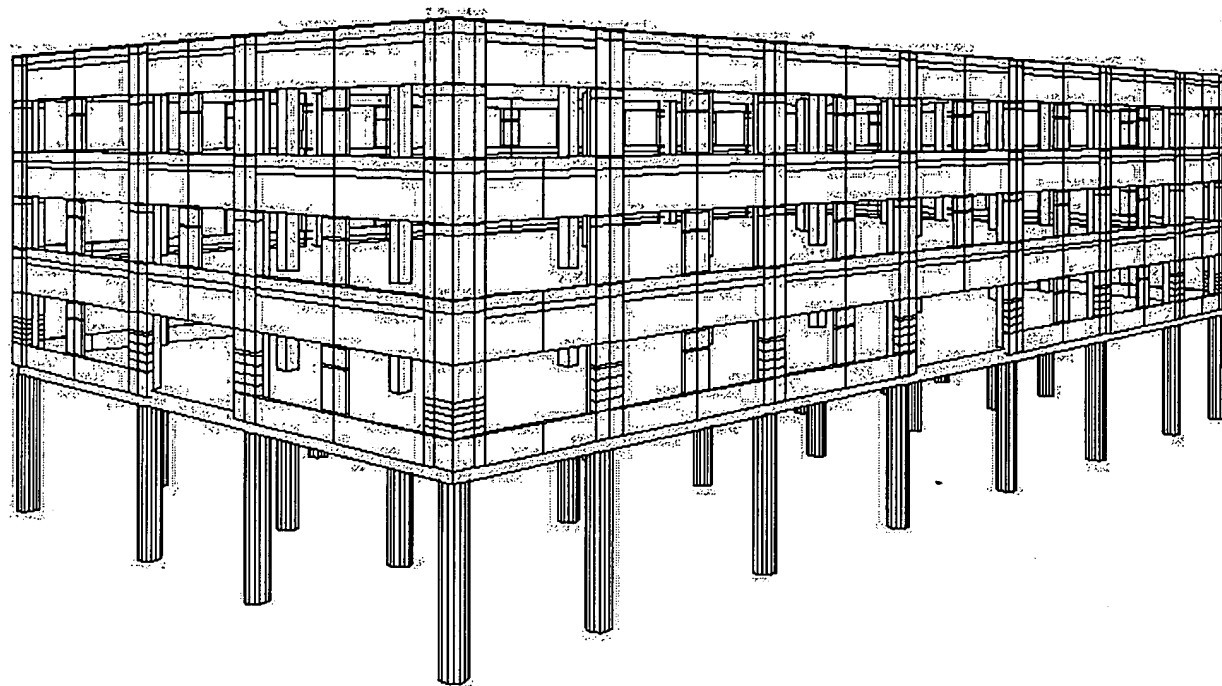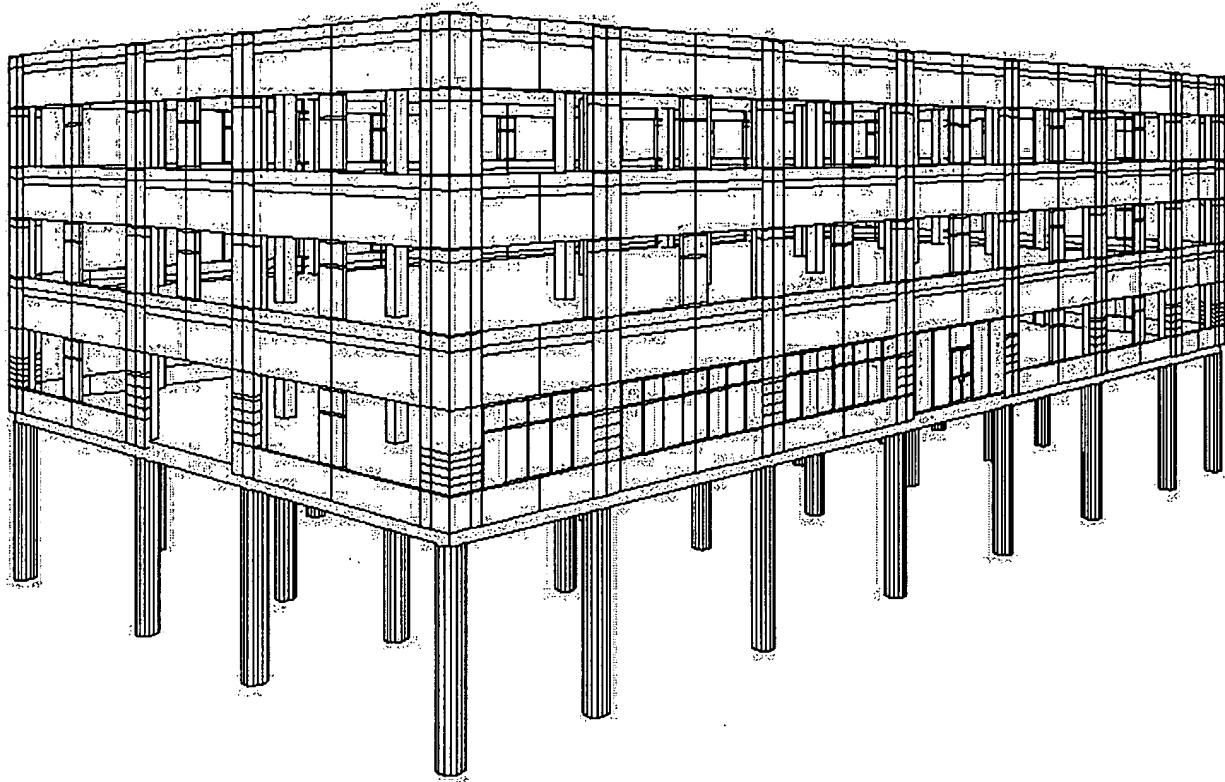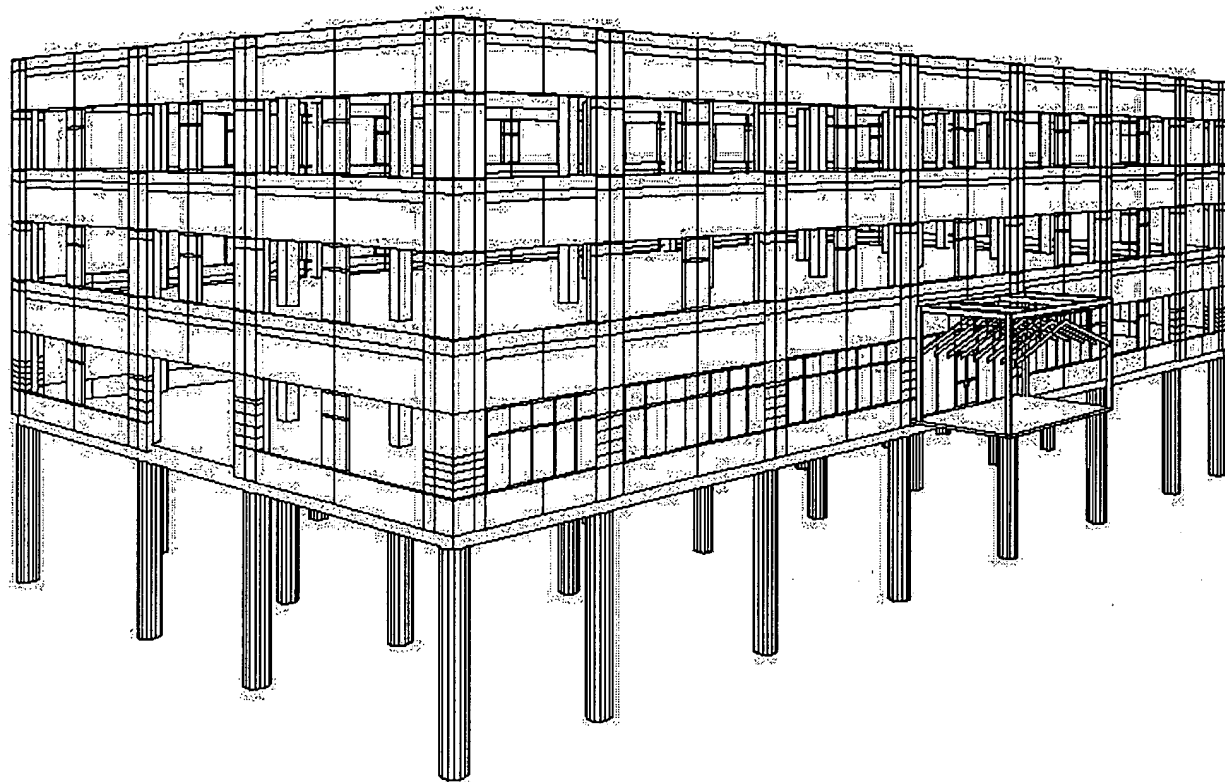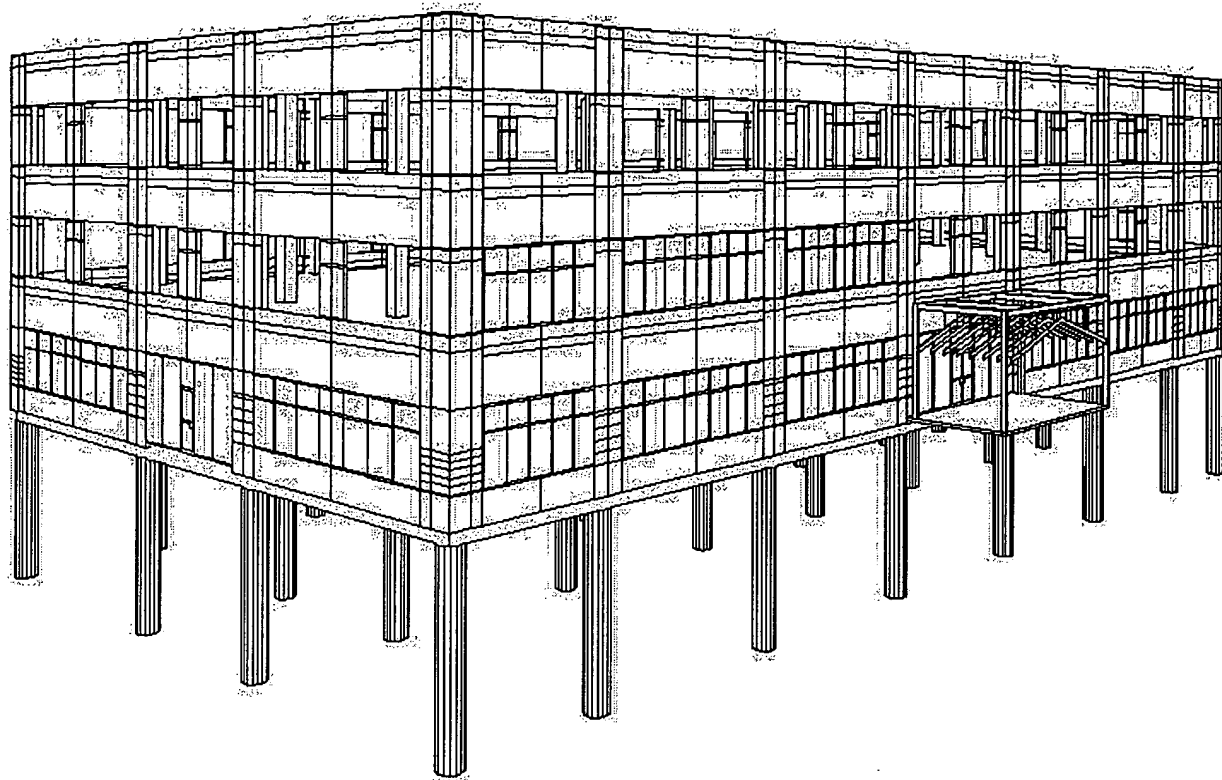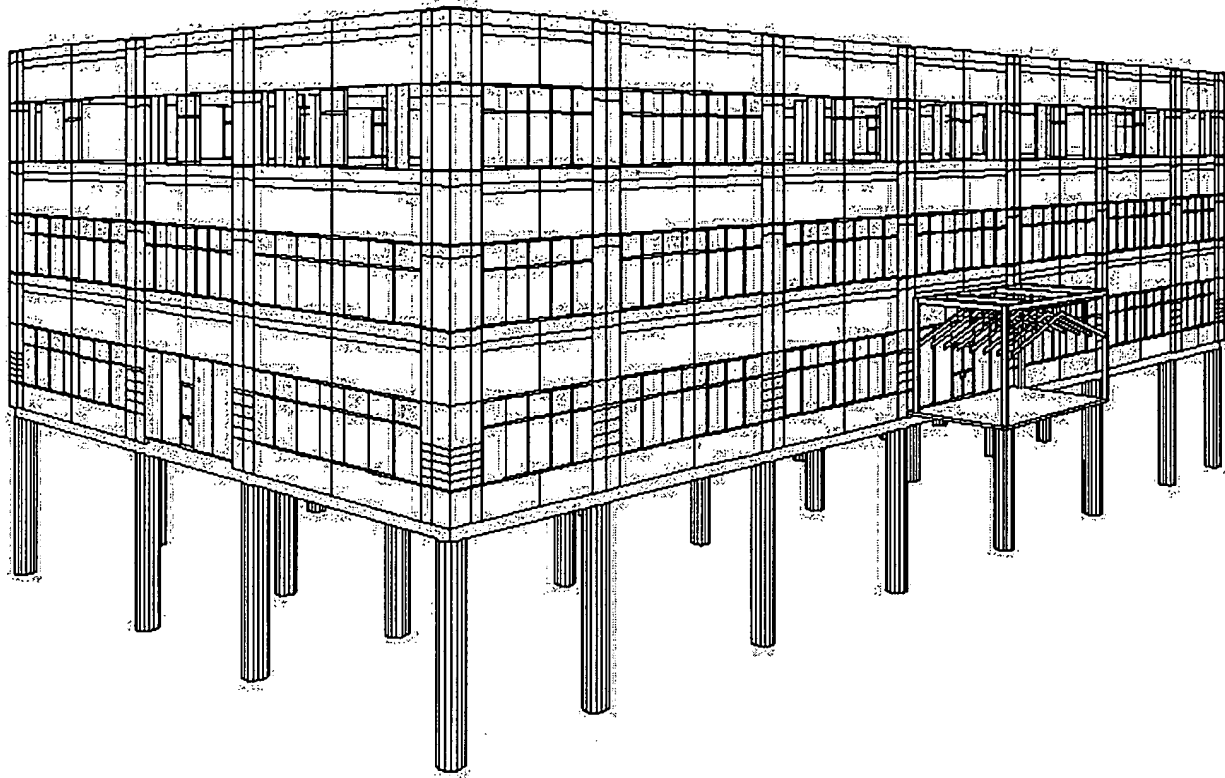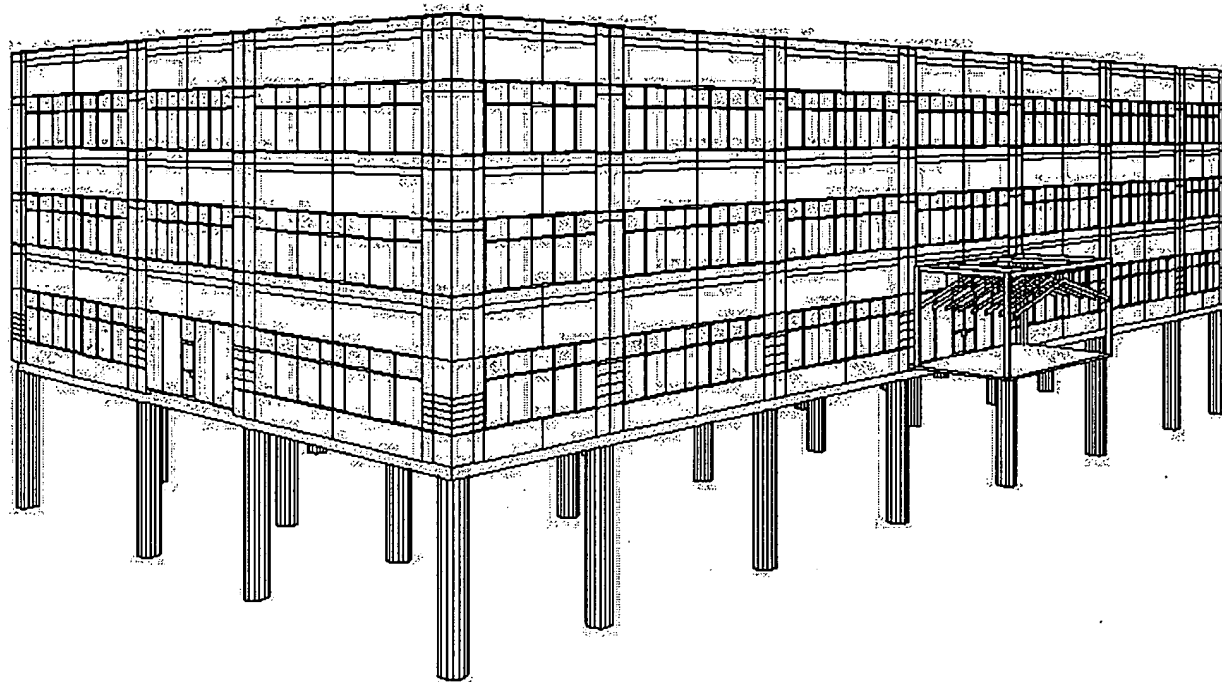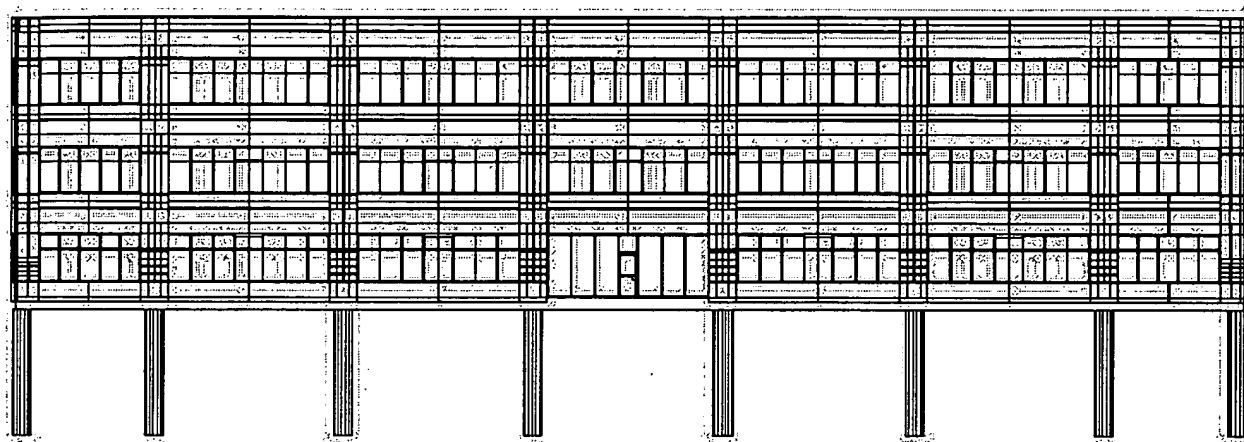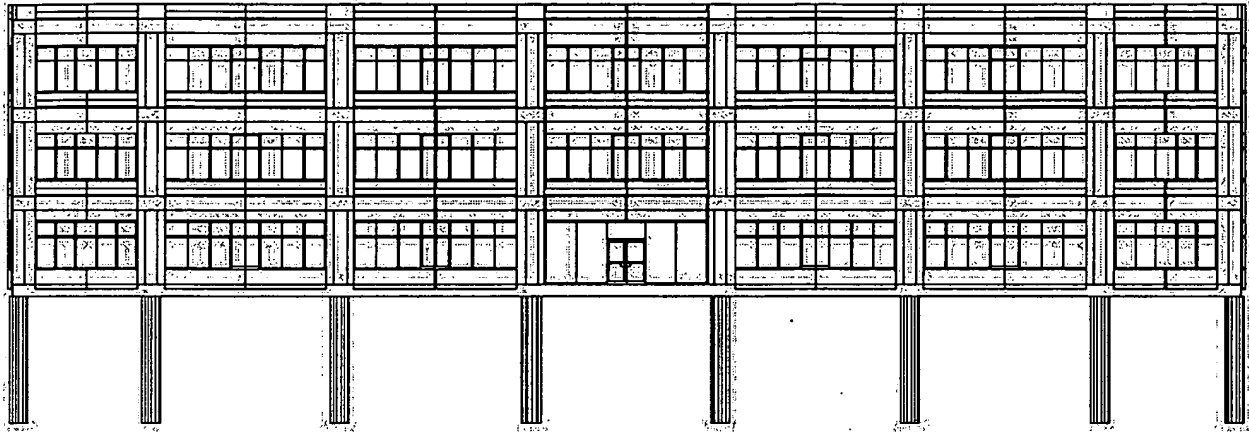
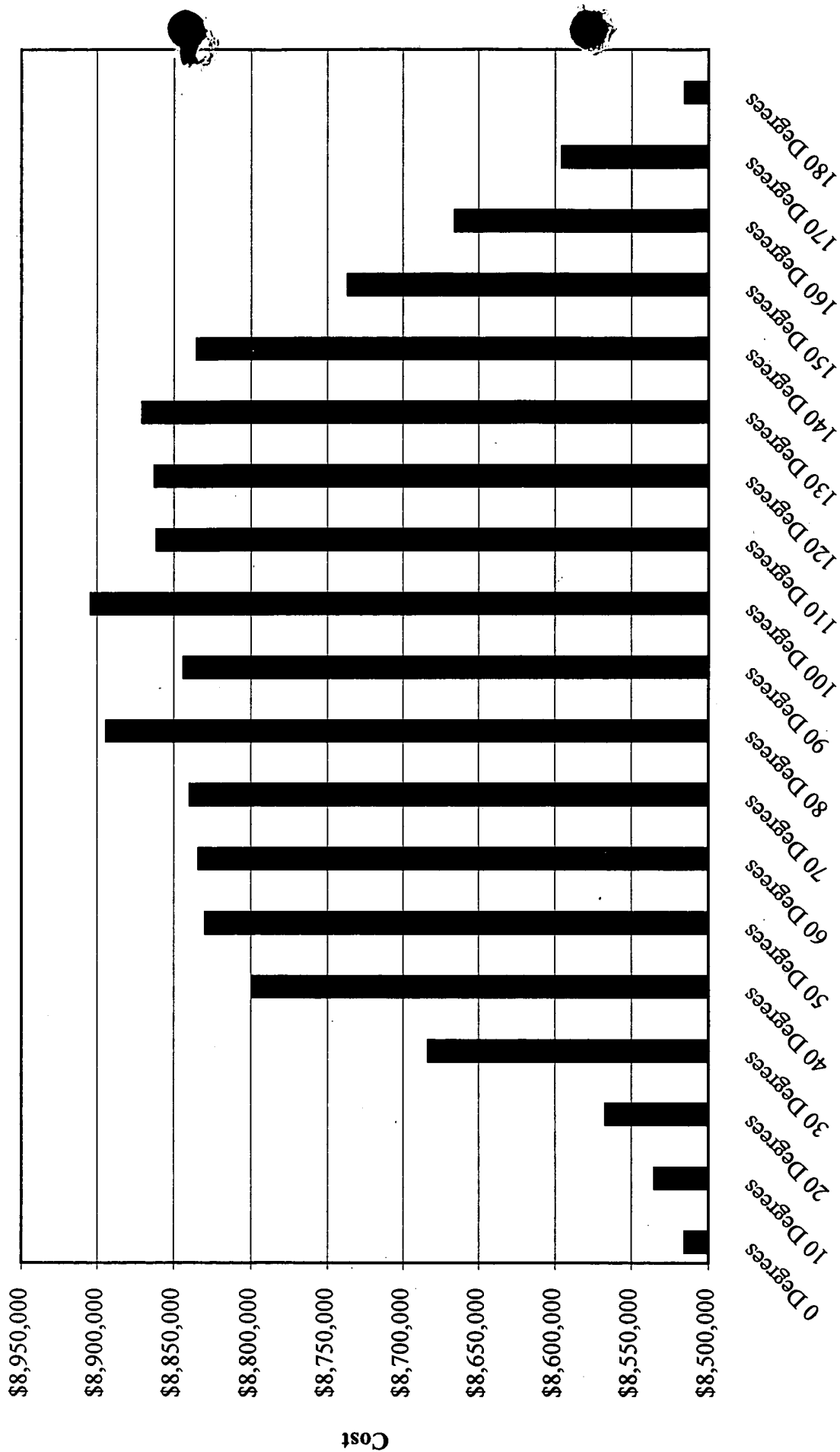Fig. 6a

"Rattle the Box"
Rotate Building on Site by 10 Degrees Each Pass

Building Rotation on Site

Cost

0 Degrees
10 Degrees
20 Degrees
30 Degrees
40 Degrees
50 Degrees
60 Degrees
70 Degrees
80 Degrees
90 Degrees
100 Degrees
110 Degrees
120 Degrees
130 Degrees
140 Degrees
150 Degrees
160 Degrees
170 Degrees
180 Degrees

$8,950,000
$8,900,000
$8,850,000
$8,800,000
$8,750,000
$8,700,000
$8,650,000
$8,600,000
$8,550,000
$8,500,000

Fig. 6b